Conservation of genetic resources of perennial crops in French Guiana

Pierre Charmetant[1] , Constance Causse[1], Michel Boccara[1], Bernard Perthuis[1], Virgile Condina[1], Fabien Doaré[2], Edouard Thinot[1], Philippe Lachenaud[3], Jean-Pierre Labouisse[4], Vincent Le Guen[4], Thierry Leroy[4]

[1] UMR AGAP, Kourou, French Guiana
[2] UPR 106, Kourou, French Guiana
[3] UPR 106, Montpellier, France
[2] UMR AGAP, Montpellier, France

Near Sinnamary, French Guiana, Cirad has been conserving genetic resources of perennial crops in a forest environment since the 1980's. About 1500 accessions of cocoa, coffee, rubber tree, palms, and forest trees, collected all over the world, are maintained in the field. A great part of them is from wild origin. Various studies on genetic diversity and disease resistance showed the value and the uniqueness of that germplasm.

Breeders have been using these genetic resources for years. Our purpose is to keep them available for local, regional, and international research and agricultural development.

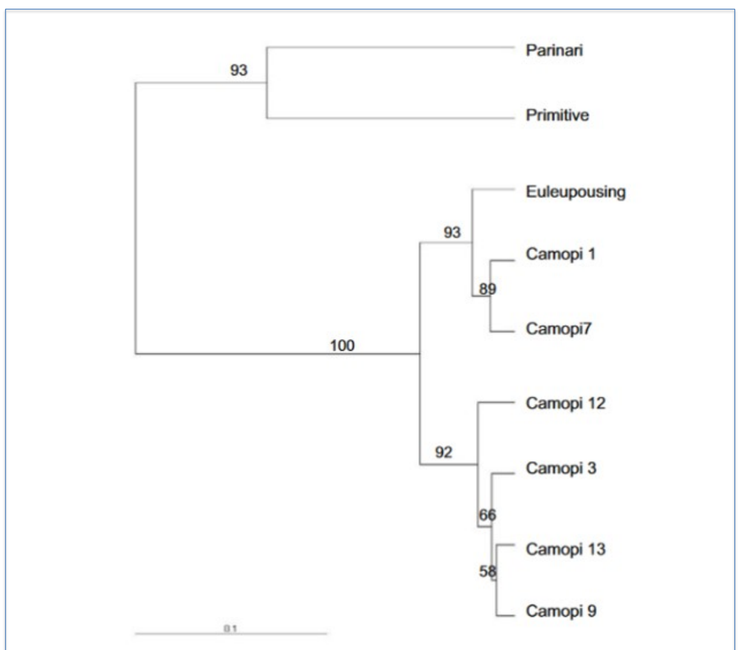
Main crops conserved

The cocoa collection contains more than 400 accessions of *Theobroma cacao* and relative species. Among them, 200 clones and progenies of wild origin belong to the 'Guiana' genetic group.

The rubber tree collection with 780 accessions of *Hevea brasiliensis* and relative wild species, collected in its Amazonian original forest, represents a large genetic diversity of the species.

The coffee collection contains 410 accessions of *Coffea spp* including the hybrid Arabusta and a large representation of the different genetic groups of the species *Coffea canephora* (Robusta).

Rubber tree collection



Dendrogram of seven 'Guiana' cacao populations and their relationship to domesticated local clones ("Primitive"), and a population from Peru ("Parinari") (Lachenaud & Zhang, 2008).

All the accessions are being characterized and evaluated for production, quality, and tolerance to the main diseases. Diversity studies have been conducted for cocoa[1] and rubber tree[2] using SSR markers. Genotyping of the *Coffea* collection recently started using GBS technology.

Maintenance cost and certification

Maintaining such collections generates recurrent costs. About 12 hectares of collections are spread within 1000 hectares of forest. The annual running cost for the maintenance of about 10,000 trees is k€ 350 and, including staff in charge, over k€ 700. Diversity studies should allow defining 'core' collections to reduce conservation costs while maintaining the global diversity.

Cirad is engaged in a quality process towards certification NF 96-600 in 2018. We focus on applying good practices for transfer and conservation processes in compliance with local, national, and international treaties and regulations. We see it as the best way to access international exchanges and partnership, and to ensure the sustainability of the gene bank, relying on funds from various sources.

Cocoa collection

For more information about CRB Plantes Pérennes en Guyane and biological material ordering, go to the FLORILÈGE web portal:

http://florilege.arcad-project.org

> RÉFERENCES

[1]Lachenaud, P. & Zhang, (2008). *D. Ann. For. Sci.* 65: 310. doi:10.1051/forest:2008011

[2]Moura De Souza L., et al. (2015. PloS One, 10 (7) : e0134607. doi:10.1371/journal.pone.0134607

CRB Plantes Pérennes en Guyane is supported by GIS IBiSA, the European Regional Development Fund through the French Guiana Territorial Community, and Suntory group.

www.cirad.fr